LOCAL P-REFINEMENT FOR STABILIZED FINITE ELEMENT METHODS

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Recently, a stabilized finite element solver has been developed to exploit the hierarchical basis capability to grade polynomial order while maintaining C0 continuity. The hierarchical basis accomplishes this by starting with vertex interpolants (a linear basis) and then allowing the polynomial order to vary on each entity (edges, faces, and regions) in the mesh which are then multiplied by blends within each element to build a composite function that is locally higher order but still globally continuous. Details of this formulation and its efficient implementation will be presented. Efficiency issues include maintaining the templated structure by grouping elements based on the maximum polynomial order of its entities. Formulation issues include the choice of the stabilization parameter, tau, for an element of incomplete polynomial order. Finally, some discussion of the relative efficiency of h, p, and h-p refinement with this method will be given.